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**The Behavior  
of Industrial Prices**



## Introduction and Summary

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### THE SETTING

"When you cannot measure", Lord Kelvin tells us, "your knowledge is meager and unsatisfactory", to which Jacob Viner proposed the addition that even with measurement our knowledge would usually remain meager and unsatisfactory. The central task of this study is to determine what measurement has done for our knowledge of the behavior of industrial prices.

Our measurement problem is posed by the wholesale price index of the Bureau of Labor Statistics. This index of "wholesale" prices began publication in 1902 (extending retroactively back through 1890),<sup>1</sup> and has been maintained ever since on a continuous monthly basis, with frequent expansions of coverage. The primary purpose of the index was to measure changes in "the purchasing power of money", a function which gradually has been yielded up to the Consumer Price Index and the Implicit Price Deflator of the Gross National Product (although the latter index is of course based heavily upon the wholesale prices).

Other questions were later addressed to the wholesale price data, and of these one of the most interesting was: how do industrial prices respond to major fluctuations in business and price levels? The inquirer was Dr. Gardiner Means, and his famous answer was that large numbers of industrial prices were wholly unresponsive to cyclical fluctuations

<sup>1</sup> "The Course of Wholesale Prices, 1890 to 1901", Bulletin of the Department of Labor, No. 39, March 1902.

of markets. These prices were "administered" by large industrial enterprises and bore little resemblance to the volatile prices which are tossed about by supply and demand in traditional competitive markets such as the wheat pit. The contemporary interest in Means' findings, published in 1934, was much reinforced by his association of sticky price behavior with the economic malaise of the Great Depression.

The present study is primarily an independent examination of the behavior of industrial price indexes—the first moderately comprehensive "test" of the official wholesale price statistics since they were initiated two-thirds of a century ago. The word "test" is at least partially misleading because when the indexes of the Bureau of Labor Statistics and of our study (labelled NBER or NB) differ, it remains to be determined which is more correct. "Test" is also misleading when it implies that we employ the same procedures and sources of data as the BLS.

### THE NATURE OF PRICES

The physical variety of products produced by most industries is substantial and for some industries it is essentially unlimited. Consider hot rolled carbon steel sheets, which are arbitrarily defined to be .23 inches or less in thickness if 12 to 48 inches wide, and .18 inches or less in thickness if over 48 inches wide. (Other dimensions are called bar, strip, or plate.) The buyer may choose among

1. Seven gauges of thickness
2. Ten classes of width
3. Four classes of length, if cut
4. Two classes of flatness
5. Two classes of squaring of ends
6. Six lot sizes
7. Three classes of oil treatment
8. Ten classes of carbon maximum
9. Seven classes of manganese maximum
10. Five classes of sulfur maximum
11. Three classes of silicon maximum
12. Seven classes of packaging

And a dozen other dimensions of product variety! Many of the 135 million varieties implied by the twelve attributes have never been produced, one may reasonably conjecture, but the varieties produced in one year must be immense. Each class has its own price. This is one product category in steel.

Tier after tier of further differences may be piled upon the physical varieties. There are terms of credit, transportation charges, guarantees of performance, facilities for replacement, techniques of arbitration of conflicts, promptness of delivery in normal times and in crisis. To be told that the base price of hot rolled carbon steel sheets was \$5.30 per 100 pounds on May 15, 1963, is rather an oversimplification of the price structure.

Faced by this indescribably numerous body of prices and terms, the Bureau of Labor Statistics chose to price a few well-defined, "typical" products and transactions. Necessarily these prices must usually be collected from sellers: every major steel producer will offer a typical product, but not one buyer of steel sheet in a hundred will continuously buy that typical product. One may certainly quarrel with the procedure of selecting typical products because it lacks a defensible basis in sampling theory, but that is not a quarrel we pursue (less out of magnanimity than due to our equal vulnerability to the charge!).

We proceed differently: we ask the cooperative buyer to tell us the price he has been paying for a particular kind of sheet he has bought over some period. Seldom will two buyers purchase identical physical products, to say nothing of the other terms of the transaction. We combine movements of these diverse prices into one index, whereas the BLS lets the well-defined product represent the class of product.

Two other details. First, the BLS will use an average of about three reporters per commodity, but with many based upon one or two reporters. We have a maximum of nearly 1,300 price reporters (many less in earlier years) for the seventy commodities, or an average of about seventeen reporters per price series at the time of best coverage. This heavier coverage reflects our distrust of the belief that there is only one price in a market at a given time (more on this topic later).

Second, we chose commodities (really classes of commodities as we have just said) which have figured prominently in the discussion of "administered prices". They include steel, nonferrous metals, basic

chemicals, paper, petroleum products, and ethical drugs. By a universal consensus that rests upon intuition much more than upon evidence, everyone believes that it is easier to price over time a pound of steel than a typewriter or other more elaborate product—if for no other reason than that the more elaborate product changes more frequently and substantially. Our study is thus heavily biased toward widely used staple industrial materials, where quoted seller prices are widely believed to be most accurate. The commodities are listed in Table 3-2, pp. 24–25.

As a final element of this orientation, let us look at the transactions whose prices we seek. The buyer of copper ingots is usually a continuous buyer—he needs copper every month or quarter, and for many years. We have shifted our example from steel to copper because the price of copper changes often (although the BLS reports unbelievably few price changes—eleven in the seventy-two months of 1961–66). A buyer *could* go out each day and shop for the cheapest seller of copper, but he would be a profligate buyer—profligate in his expenditures on search, negotiation, testing of products, and all the other costs of creating and maintaining a trading relationship. So he commonly buys on contract, often at a fixed price which is his estimate of the average price over the contract period. (The contracts often allow for a renegotiation if the market “spot” price moves outside the range of expected fluctuation.) This is more economical than buying *de novo* each time, exactly as it is cheaper to rent an apartment for a year rather than by the week. We are not the first economists to be surprised at the economic sophistication of the market: we must record our regret that we did not make a systematic study of the use and duration of contracts.

The BLS collects “spot” prices (whether those actually paid or not); we collect the contract prices. A large part of the short-run (within the year) differences between the two sets of price indexes come from the difference in type of prices sought.

We, as others, wish to turn necessities into virtues: the contract prices seem to us more appropriate to the measurement of the effects of prices upon both costs of buyers and receipts of sellers.

## THE MAIN FINDINGS

### Trend

Our price history covers ten years, and we begin with the obvious question: do the BLS and NB indexes differ in the broad sweep of their movement over the decade? This was originally a mechanical question—one normally seeks to separate the trend of time series—to which we received an unexpected answer. The trend of prices was essentially the same in the two groups of indexes during the first five years (through 1961), and this was exactly what we expected. But the BLS rose about .7 per cent a year relative to the NB index in the second period, and the literature of price indexes had not prepared us for this. The difference was too strong and general to admit the possibility that it was merely a sampling fluctuation.

The only plausible explanation we have produced for the tendency of quoted selling prices to lag in the downward movements that dominated the period is that there is an asymmetrical inertia in industrial price movements. Price quotations are not revised immediately when market conditions, and transaction prices, change: both the costs of changing prices and the desire to confirm the persistence of the price change dictate some delay. This delay operates more strongly against reductions in price quotations than against increases: inflation has made for a general upward drift of prices (so, on average, price increases are more likely to persist than price decreases). In addition, the policy of price "guidelines" and the possibility of more formal price controls in an age of international violence make it prudent for a businessman to be slow in authenticating price reductions and prompt in authenticating price increases. The data bear this view out: there is no systematic trend difference between BLS and NB price indexes when NB prices are stable or rising, but a most pronounced difference when NB prices are falling.

### Cyclical Behavior

The main thrust of the doctrine of administered prices is that contractions in business lead to no systematic reduction of industrial prices, and, much more equivocally, expansions in business may only



tardily lead to price increases. Whether because of a simple desire for stability, or more subtly because perhaps profits are better protected by stable prices, it has been argued that prices have at best only one-way flexibility, and that upward. The finding of Gardiner Means in his original study that numerous prices changed not at all, once, twice or a few times in a decade including the Great Depression was *the* sensational part of his study.

A great majority of economists have accepted this finding even though no explanation for this behavior of oligopolists commands general assent. Prices of concentrated industries—and most of our products are produced by industries that are so viewed—do not respond to reductions in demand, or so it is believed. We raise grave doubts of the validity of this belief.

Our period contains two short contractions, July 1957 to April 1958 and May 1960 to February 1961, according to the National Bureau chronology. It also contains one ordinary expansion, April 1958 to May 1960, and one of extraordinary length, February 1961 to the end of our period. This latter expansion is so long that it partakes of a trend, and so we distinguish the short, sharp expansion at the end of the period (say, November 1964 to November 1966—months dictated by our use of three-month averages) as a second expansion. Our decade clearly does not test the flexibility of prices in major depressions or major inflations, but we could not repair (or rather, damage) this characteristic of recent economic history.

Even the BLS price indexes are not especially cordial to this view of cyclical rigidity, and our price indexes are emphatic in their contradiction of it. We may tabulate the directions of price change including and excluding steel products (which are numerous in our sample and atypical in their price behavior) in the two contractions:

Price Changes	All Prices		Excluding Steel Products	
	BLS	NB	BLS	NB
Decreases	23	40	23	40
No change ( $-.05$ to $+.05\%$ per month)	19	10	16	7
Increases	26	18	18	10

Similarly in the two expansions, we tabulate the results including and excluding steel products:

Price Changes	All Prices		Excluding Steel Products	
	BLS	NB	BLS	NB
Increases	36	37	36	36
No change (-.05 to +.05% per month)	20	14	18	13
Decreases	14	19	5	10

It is difficult to generalize these results because our collection of commodities is in no sense random; indeed it is purposely concentrated in the areas where "administered" prices are most often said to exist. Even with this bias, if such it be, toward price rigidity, we find a predominant tendency of prices to move in response to the movement of general business. As a summary figure, in the four cycles we find prices moving in the same direction as business 56 per cent of the time; remaining constant 17 per cent of the time; and moving perversely 27 per cent of the time.<sup>2</sup> Since there is no reason on earth or in space why all prices should move in the same direction, especially during relatively mild expansions and contractions, we find no evidence here to suggest that price rigidity or "administration" is a significant phenomenon.

### Short-Run Fluctuations

The short-run movements of the BLS and NB indexes differ systematically in one respect: the NB index changes much more smoothly. The BLS indexes usually alternate between periods of little or no change and periods of large and fitful movement. We consider this difference to be favorable to our index. We share with Alfred Marshall the view that *natura non facit saltum*.

The correlation of changes in the two indexes is not very high (for example,  $r = .32$  for simultaneous monthly movements), and neither series systematically leads the other. Yet the BLS prices should lead; spot prices should lead an average of contract prices of varying months of termination.

<sup>2</sup> If we first remove the trend, the corresponding percentages are 54 per cent of prices change with business, 34 per cent are constant, and 12 per cent move perversely.

### Other Studies

Lest the readers stop with this introductory chapter, we shall only mention three other topics:

1. We compare private and governmental prices for a small sample of products (Chapter 4).
2. We compare weighted and unweighted price indexes (Chapter 4).
3. The dispersion of movements of prices paid by individual buyers is analyzed in the light of the economics of information (Chapter 7).